Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Inquiry Regarding Carrier Current Systems,	)	ET Docket No. 03-104
including Broadband over Power Line Systems	)	
	)	
	)	

Comments of Adaptive Networks, Inc.

Adaptive Networks Inc. ("Adaptive"), by its attorneys, hereby files comments in the above-captioned proceeding. Adaptive is a global provider of communications technology allowing high speed data networks to operate over an existing wiring infrastructure. Adaptive will be directly affected by the outcome of this proceeding.

Among the many questions posed in the Inquiry, the Commission has requested comment on a method of measuring radiated emissions from both Access BPL and In-House BPL.[1] This matter was last addressed by the Commission in Docket 98-80, In the Matter of the 1998 Biennial Regulatory Review – Conducted Emissions Limits Below 30 MHz for Equpment Regulated under Parts 15 and 18 of the Commisssion's Rules.

Based on its work with the Commission's Laboratory staff in 1998, Adaptive filed comments in Docket 98-80 detailing a modification of the ANSI C63.4 open field measurement procedure, adapted for measuring the radiated emissions from carrier current systems operating below 30 MHz. This procedure, repeatable and inexpensive, rendered the cumbersome, inexact "three house" rule unnecessary and was, in fact, accepted by the Commission as a valid procedure for one of Adaptive's devices. Rather than addressing the radiated measurement issue, however, the Commission deferred action, preferring to await the results of an international effort to develop harmonized standards.[2]

Now the method of measuring radiated emissions is again an object of Commission interest. Adaptive takes this opportunity to re-file as an attachment its comments in Docket 98-80 and recommend once more the open field measurement procedure it and members of the Commission's Laboratory staff devised in 1998. Adaptive believes that this procedure is applicable equally to BPL devices used for both Access and In-House

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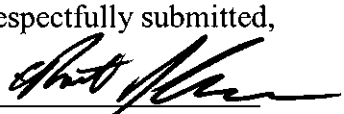
[1] Currently, Section 15.31(d) specifies that for carrier current systems operating below 30 MHz, radiated measurements should be made at a minimum of three installations that can be demonstrated to be representative of typical installations (the "three house" rule). The three house rule has long been recognized as inexact, impossible to replicate, and very expensive

[2] The international effort has to date produced no results.

systems. Of the many issues raised in the instant proceeding, Adaptive believes at least the matter of radiated emissions measurements has already been resolved and its proposed test procedure should be formally adopted.

Respectfully submitted,



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June 25, 2003

ATTACHMENT

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
1998 Biennial Regulatory Review -- Conducted Emissions Limits Below 30 MHz for Equipment Regulated Under Parts 15 and 18 of the Commission's Rules	)	ET Docket No. 98-80 Notice of Proposed Rulemaking

COMMENTS OF
ADAPTIVE NETWORKS, INC.

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January 31, 2000

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
1998 Biennial Regulatory Review -- Conducted Emissions Limits Below 30 MHz for Equipment Regulated Under Parts 15 and 18 of the Commission's Rules	)	ET Docket No. 98-80 Notice of Proposed Rulemaking

COMMENTS OF
ADAPTIVE NETWORKS, INC.

Adaptive Networks, Inc. ("Adaptive"), through counsel, submits these comments in the above-referenced Notice of Proposed Rulemaking, FCC 98-102 (released October 18, 1999) ("NPRM"). Adaptive commends the Commission for seeking to update and harmonize its conducted emissions limits on AC power lines. As a result, this proceeding offers an ideal opportunity for the Commission also to clarify the EMC test procedures that apply to all wire and line-conducting technologies operating below 30 MHz (hereinafter "carrier current"). This includes not only the power line technologies but also other wireless technologies such as twisted pair (e.g. Ethernet), telephone line (e.g. Digital Subscriber Loop), and cable facilities used for data communications.[1] As the Commission itself observes, many such devices are now being developed for the

[1] This is consistent with the Commission's proposal to include such technologies. *See NPRM* at ¶ 32.

provision of high-speed data transmission and Internet access within and among homes and businesses. The absence of clearly defined and repeatable test procedures, however, creates unnecessary regulatory barriers to manufacturers and users of these important, emerging technologies. Adaptive, therefore, urges the Commission to adopt measurement procedures that can be used at open area test sites to verify radiated emission limits for carrier current systems operating below 30 MHz.

DISCUSSION

As explained in earlier comments submitted in the Notice of Inquiry[2], Adaptive is the developer of high-speed carrier current devices that utilize local (in-building) electrical power lines to transmit data among personal computers and other digital devices. Adaptive's technology uses a wideband spread-spectrum-like signaling with fast synchronization, adaptive equalization and power-line-optimized MAC and link layer protocols to achieve the high data rates required by Internet users. Demand for such devices has grown dramatically as the ever-increasing need for high-speed data transmission among users continues to transform the U.S. economy and society at large. To meet this exploding demand, it is essential that the Commission's rules and measurement procedures keep pace with these changes in the market.

In the NPRM, the Commission proposes to maintain the status quo on conducted emission limits for carrier current devices.[3] Although Adaptive had urged that carrier

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[2] *See Notice of Inquiry* in ET Docket No. 98-80, 63 Fed. Reg. 34618, June 25, 1998.

[3] *NPRM* at ¶ 30.

current systems be given parity with other unintentional radiators which are entitled to a 13 dB relaxation for broadband emissions, it accepts the Commission's determination, for now, that the conducted limit test procedures be left in place.[4] For radiated emissions testing below 30 MHz, however, the Commission acknowledges that relief may be "desirable" and requests comment in this area.[5] The Commission notes, for example, that the existing requirement in Section 15.31(d) of the rules for the testing of carrier current systems at a minimum of three sites that are representative of typical installation sites, imposes a significant "testing burden" on manufacturers.[6] Accordingly, the Commission specifically requests input on alternative test procedures including those that would (i) enable carrier current devices to be tested at open field test sites,[7] or (ii) allow for the use of a conducted power limit, outside the AM radio band, as a substitute for demonstrating radiated emission compliance.[8]

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[4] *NPRM* fn 33.

[5] *NPRM* at ¶ 31.

[6] *NPRM* at ¶ 26.

[7] *NPRM* at ¶ 26.

[8] *NPRM* at ¶ 31. Because Adaptive has been involved in the development of an open field radiated emission test procedure that is fair and repeatable for all types of carrier current systems, it favors this approach. Additionally, it questions whether Microsoft's proposal for a conducted power test as an option to radiated emission testing below 30 MHz would be useful for all types of carrier current systems and other unintentional radiators. In particular, extrapolating radiated emissions as a function of conducted output power may vary considerably depending on the particular signaling and coupling methods used. Therefore, a more accurate method for determining radiated emissions is to create a reproducible set up procedure to measure actual radiated emissions.

During the past year, Adaptive has worked closely with the FCC Laboratories technical staff[9] to develop specific modifications to the ANSI C63.4 Measurement Procedures for use with carrier current systems. These modifications, set forth below, are technically sound, repeatable and cost effective for manufacturers because they allow for open field testing at standard EMC test facilities. Thus, they are designed to supplement ANSI C63.4, whose basic test procedures and instrumentation requirements for radiated emission testing (including testing above 30 MHz) are left unchanged.

> Measurement Distance: Measurements below 30 MHz should be made at 3 meters and extrapolated to the 30 meter limits set forth in Section 15.209 using an inverse distance squared ($1/d^2$) conversion factor.
>
> Wire Length: In general, testing should be performed on 3 different wire lengths: one-half wavelength, one-quarter wavelength, and one-eighth wave length, based on the fundamental frequency of the device. Constraints imposed by test lab dimensions may require a different set of test lengths which should be arranged with the FCC Labs.
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> Wire Orientation: Wire lengths should be measured in both a horizontal and vertical configuration. It is not necessary to bend or loop the wire. A compromise configuration may be necessary if the test site cannot accommodate a full vertical extension, e.g. "elbowing" would be acceptable. For worst case horizontal testing, the wire should be elevated 1 meter above the ground plane. Test wire lengths (other than ordinary power and data cables) do not need to be connected for measurements above 30 MHz.
>
> Wire Termination: The wire should be terminated by a LISN (50 Ohm resistor in series with decoupling capacitor on both line and neutral) or equivalent impedance network. The LISN may be powered off the same line as the transmission source.
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> Antenna Position: In the scan mode, the measurement antenna should be moved along the wire length and rotated for all frequencies to determine the highest emission levels. Full compliance testing should be performed on all wire lengths at these highest emission frequencies identified in the scan mode.

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[9] Adaptive worked with Greg Czumak of the FCC Labs engineering staff in 1998 to develop the procedures set forth herein.

Adaptive submits that these procedures allow for radiated emission testing of carrier current devices in a manner that assures compliance with the applicable limits yet relieves manufacturers of the "testing burdens" recognized by the Commission. The need for updated procedures is particularly compelling in light of the mass-market demand of carrier current technology not just within, but among, homes and businesses.

CONCLUSION

As Adaptive has noted, this proceeding provides an excellent vehicle for the Commission to modernize its rules for radiated emission testing of carrier current systems as an alternative to the impractical and unwieldy *in-situ* procedures. In updating its rules, the Commission will be promoting the use and deployment of high-speed Internet access and data transmission services to consumers and businesses. Based on the foregoing, therefore, Adaptive urges the Commission to implement the carrier current emissions test procedures proposed herein.

Respectfully submitted,

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